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OF THE

USEFUL CABINET.

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PHYSICAL HINTS AND QUERIES.

BY JAMES SIMS, M. D. &c.

EXTRACTED FROM THE MEMOIRS OF THE MEDICAL SOCIETY OF LONDON.

IN philosophizing there are two grand sources of error. The first is the determining what any thing is prior to the making proper experiments upon it. The second is not less important and common; it is the taking for certain the first conclusions drawn from appearances, without sedulously examining all the various causes that may produce or affect those appearances. In no instance have these causes of mistake operated, perhaps, more powerfully or uniformly than in the different opinions concerning the parts and constitution of this world which we inhabit. True philosophy consists in being very circumspect in attaining all the necessary facts, but having them, being fearless as to the conclusions to which they may lead. Truth can never do harm, nor need an apology.

1. MATTER has been said to be totally inert, and modern philosophers have discoursed of the vis inertiæ, or the power of inactivity, in other words, the activity of inaction. Were I to state my opinion, it would be, that every particle of matter in all nature possesses a variety of inherent powers of motion and action, nay, is in a continual state of activity.

If a stone be held in the hand, it seems inert; but remove the hand, and it instantly falls to the ground: what kept it, then, in a state of apparent inactivity? The stronger action of the hand. A horse is not in a state of inactivity who is pulling at a load which he cannot move, his inaction is only apparent;

cut his harness, and his activity is instantly evidenced by his rapid motion forward. Gravity is, therefore, an action.

The vis inertiæ is said to be in proportion to the quantity of matter in any body. Thus a ton weight is beyond the power of any man to move from the ground. But put it in one scale, and an exact equivalent in the other, and if the beam be a good one, a single horse hair will move both of them up and down, or stop them if in motion. What, then, was their vis inertiæ in the first instance, but their power of gravity acting uncontrouled, and preventing motion ?

The vis inertiæ, as it is called by some, of moving bodies, or that power by which they resist being stopped, which seems to be the same as their momentum, is said to be in proportion to their quantity of matter and the velocity of the motion. But is it not evident from the case above mentioned, where two tons when in motion are so easily stopped, that the power requisite to stop motion, has nothing to do with the quantity of matter moved, but only with the power first moving it, to which it must ever be equal ?

If a weight be supported by a cord it appears inactive ; cut the cord, and by its instant motion downwards, it shews the contrary : what, then, hindered it from falling ? The cohesion of the cord. Remove this commonly called attraction of cohesion, and the action of the cord ceases. Cohesion is then an action. Gravity and cohesion have been lately called laws ; but can law mean here any thing else but the measure of an action ? A few have indeed attempted to explain this particular action of solids, by referring it to an ideal æther, or the general action of the atmosphere, called its pressure ; but this is only transferring the action from one species of matter to another ; and is there any proportion between the weight that may be supported by a silk cord, or an iron pillar, and the weight of the air pressing upon their surface ?

Lay a piece of dry wood upon the floor, it appears inactive, as to heat ; but throw it upon the fire, and it soon catches flame. It may be said that the fire acts upon it, that is, the wood formerly set on fire is active, and the latter piece becomes, when burning, active in its turn to other pieces heaped upon it. A mass of gunpowder may remain long quiet, but let a spark of fire be applied to it, and it instantly shews tremendous activity. Fire is always in action.

A bullet is quiet when laying on the earth, but when propelled from the mouth of a cannon it rends walls or ships. It

would seem not to require a Solomon to tell us that motion is action, at least when impeded by any substance whatever, yet has it been called a law. All matter when put into the action of motion, continues so to act until stopt by as strong an action as what first moved it. This is the law, but the cause is the inherent power of so moving, or, in other words, acting. The ancient philosopher thought that the best argument to convince his antagonist, who denied the existence of motion, was to rise up and walk ; and a man of plain common sense made use of a similar mode with the ingenious bishop Berkeley, who denied matter altogether, but who having run his head against a post, the other ironically said, " it is no *matter*." The same mode of arguing might be used here, but I hope that they, who do not consider motion as action, will not be so fully convinced of their theory as to expose themselves to a battery of cannon, otherwise one of the bullets may give too convincing a proof of its destructive activity. The converse of this proposition is also true ; action is motion, or, at least, an attempt to move.

The seed of a vegetable when planted in the ground, is first acted on by heat, moisture, and the earth ; these three then, which are material, are all in action. The seed also soon becomes active of itself, it increases, shoots out a stem, removes the earth from above it, and raises itself aloft, where it produces for our use other seeds like itself. Thus not a bit of bread which we eat, but shews the activity of matter. If the vegetable were a fruit tree, after a certain number of years it becomes active to the annual production of fruit, each of which are capable of producing other trees, agreeably to regular stated laws. Unless we allow a soul in plants, the sensitive ones will ever shew to the meanest understanding an activity in them : whilst to the cultivated mind the whole vegetable kingdom demonstrates similar though weaker action.

Every change which we see or can produce, arises from the activity of matter. Thus effervescence, boiling, distillation, and fermentation, with their products, all depend upon it. But to the chemist all Nature shews its activity, there not being a single particle of matter in this nether world which does not act, chemically, upon some other. All the tables of elective attractions are only a few of the infinitely varying actions of the different parts of matter.

A fluid cannot become solid, nor a solid fluid, but by the action of matter. Heat and cold universally shew it ; light is in

continued and very varied action. Electricity exists every where, one of the most active substances.

Magnetism is an action of some particular parts of matter, familiar to and conceivable by, the weakest mind.

Some philosophers have gone so far, as to allow of one species of matter being possessed of activity, whilst they deny it to all the rest. This highly favoured matter of theirs is electricity, or, perhaps, the element of fire. Whensoever they are able to deduce experimentally all, or most of the infinitely numerous actions of Nature from that one, I shall not object to their system. in the mean time it may be remarked, that they have got over the stumbling block of all who regulate their opinion of Nature not by what is to be seen in it, but by systems formed *a priori*. Let me also ask whether it be a whit less objectionable, or irrational, to allow activity to one species of matter, than to all? Does it not appear that the different parts, or particles of matter, are endued with activity different both in kind and degree? Electricity, or fire, therefore possessing great degrees of it, is allowed by them this superior privilege, whilst all other matter is left in its supposed inactive situation.

Besides the rapid powerful fire emitted by electricity, it has other well known powers of attraction and repulsion, which the hardiest stickler for the inactivity of matter will find difficult to account for.—Capillary tubes also shew an action upon fluids, so powerful, as even to conquer the effect of gravity.—The elasticity of cords, and various animal and vegetable substances is very great. But that is much exceeded by springs of metals, particularly steel, as is evinced among various machines, by the common watch or time-piece.

I have not mentioned the retarding action of the friction or attrition of machines in motion, as, I believe, that will mostly be found not to exist, except as an action of gravitation. Thus in a beam and scales the descending weight is placed at a less distance from a perpendicular line drawn through the point of suspension, than the ascending, in proportion as it goes down; a greater weight, therefore, becomes gradually necessary to carry it lower: in machines with wheels, as coaches, during the revolution there is a constant attempt to place the weight higher, and in pullies the same thing happens in the machine independent of the raising of the weight. Something similar, perhaps, takes place in all other pieces of mechanism where friction has been said to do so much, but where, in reality, the

effect is produced by small differences of gravity, the action of which, in that particular instance, is not readily and evidently perceived, and therefore is not taken into calculation.

Thus not a house or ship which we build, not the clothes which we wear, not a barometer, thermometer, hygrometer, clock, nor watch, we contrive, but tells us the activity of matter. Not a tree nor plant which surround us, and afford us nourishment and health, not a river which runs, nor the ample sea which receives them all, with its various tides and currents, but holds out the same doctrine. Every breath of wind that blows, cloud that skims sublimely along, and even rain, hail, or snow, demonstrate it. Music, with all its fascinating charms, conveys it to our souls. The majestically rolling thunder proclaims it aloud; the vivid lightning's flash infixes it in our hearts. Volcanos and earthquakes bring the most terrific evidence of it. The stars and moon by night give their apparently feeble testimony in favour of it, and during the day the enlivening, glorious sun blazes it forth to all mankind. Nothing that we smell, taste, feel, hear, or see, but shews it; the earth, and probably all Nature, is held together by it: let us then not vilify the works of the Supreme, who has made nothing ignoble, nothing uninstructive, nothing base, useless, nor inactive.

2. Let us next examine what are the probable consequences of this activity of matter. The powers of man are extremely limited as to matter. We can no more destroy a single particle of matter than we can create the whole universe; nay, perhaps, we cannot even change its elements. But is Nature, or, in more proper words, the order established by the *Supreme*, so limited in its operations? It can probably change all the elements, and it is possible that to it there is but one element. If so, is not that one light? The matter of heat and electricity being but modifications of it: from these then, by a farther step, are not the different species of air formed? Thus, when water is made to boil in transparent vessels, air bubbles are seen to arise constantly from the bottom. Is not this a conversion of fire into air? That this latter, with the assistance of the former, produces water, we know, by the recently invented experiments of that greatest of chemists, Lavoisier; and do we not see it every day confirmed in the formation of rain, which I have seen in the Alps formed under my feet, in the driest spots, where evaporation seemed impossible? Is not air also changed into water by animal respiration? From all these elements op-

erating together are not, possibly, earths, salts, and metals, produced, in short, all the bodies usually denominated solid? I remember an experiment quoted by a late ingenious professor, which, if accurate, seemed to prove the last query. This was, that water on repeated distillation always left a residuum of earth behind, and that the proportion of this residuum was greater in every succeeding distillation. If this be true, is not the whole convertible into earth? But to leave what I fear is a doubtful experiment, do not the trials of plants growing in water solely, or in mould watered every day, in which case the earth is not diminished though the vegetable increases greatly, shew this conversion in a striking manner?

It will to some appear impossible that all the most dense bodies should thus be formed, from light or heat, which they conceive to be so inconceivably rare. The supposition of the vast tenuity of this element is borrowed from its possessing little gravity, which is thus made the sole test of density. But has the body, which penetrates all others with the utmost facility, more and greater interstices than those that are penetrated by it?

3. If this conversion of what appear to us as elements be true, to what conclusions will it lead us? Must not this globe which we inhabit be necessarily increasing in bulk every day?

That this is the case may be inferred from the vast variety of matters which were beyond all controversy formerly on its surface, and which we now find buried in its bowels at various depths. These are found not only under vallies, and in the deepest mines, but also under high hills, and even mountains. They are found frequently with little alteration, and in a high state of preservation. They consist principally of the hardest parts of animals and vegetables. Thus of the former we have the shells of land snails, cockles, escalops, perriwinkles, echini, and others; the horns of moose deer; the teeth, bones, and even entire skeletons of fish and land animals: of the latter kingdom we find the trunks of roots of trees, and also their nuts, fruits, cones, buds, chives, and even leaves. Of this I once saw a remarkable instance in a neighbouring kingdom. A well was sinking near the summit of a hill; after passing through above sixty yards of a turf blue clay, the miners came to a turf bog, or peat moss, as it is called here. Near the bottom of this last was found a quantity of hazel nuts, and even leaves of the trees, a handful of which nuts I preserved for a great length of time. They were at first wet, soft, and seemingly swelled by the moisture, and, on growing dry, they became very friable,

never regaining their consistence, although they retained their shape and appearance. The leaves soon crumbled into dust. This incident, trifling and irrelevant as it may appear, which happened about thirty years ago, was the first cause of my doubting the Newtonian system, and indulging in the before written speculations.

Pieces of timber, fashioned for the various purposes of houses, have been dug up at great depths, and parts of houses have even been found there. There is also scarcely an animal or vegetable, or part of them, which is not found petrified in various places at different depths, besides the echinitæ, ostracitæ, conchitæ, muitæ, cochlitæ, clenitæ, or pectinitæ, and insects and other things inclosed in amber.

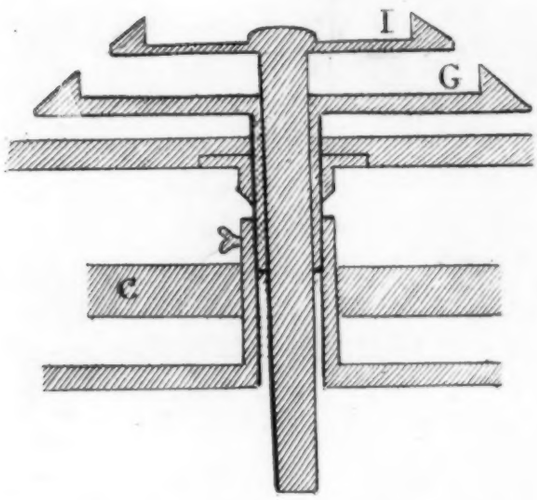
Some writers have thought that these shells, &c. were produced where found; but this is too ridiculous to need refutation. Others have ascribed all to the general deluge; but this being avowedly a miracle, is an unfit subject for natural history. Linnæus, one of the most religious of men, laying aside this last as a cause, thinks, that at the creation the whole globe was covered by the sea except the top of one mountain, which was called the garden of Eden, and that ever since that time the water has been uniformly retiring, and the habitable land thereby increasing. But unluckily for this theory, during the last 2000 years, of which we have an accurate account, is it certain that the sea has been gaining upon the land less in some places than it has lost in others?

4. Continuing this system, I would say, that throughout all Nature the parts of matter, within certain limits, and under certain regulations, have the power of producing their like through the medium of these changes of the elements. The faculty which animals and vegetables have of generating their own species is well known, but the general rule mentioned above, extends vastly farther. The several parts of living animals have a similar power: thus bone is produced by bone, tendon by tendon, blood vessel by blood vessel, and nerve by nerve, as may be known by destroying some part of any of these. The same happens as to parts of vegetables, and in the mineral kingdom does not the same thing occur to a very great extent? The proofs and consequences of this I have not time at present to lay before you, but shall endeavour to collect them into a future paper for the use of the Society, together with many other parts of the subject, among which the following will not be the least interesting.

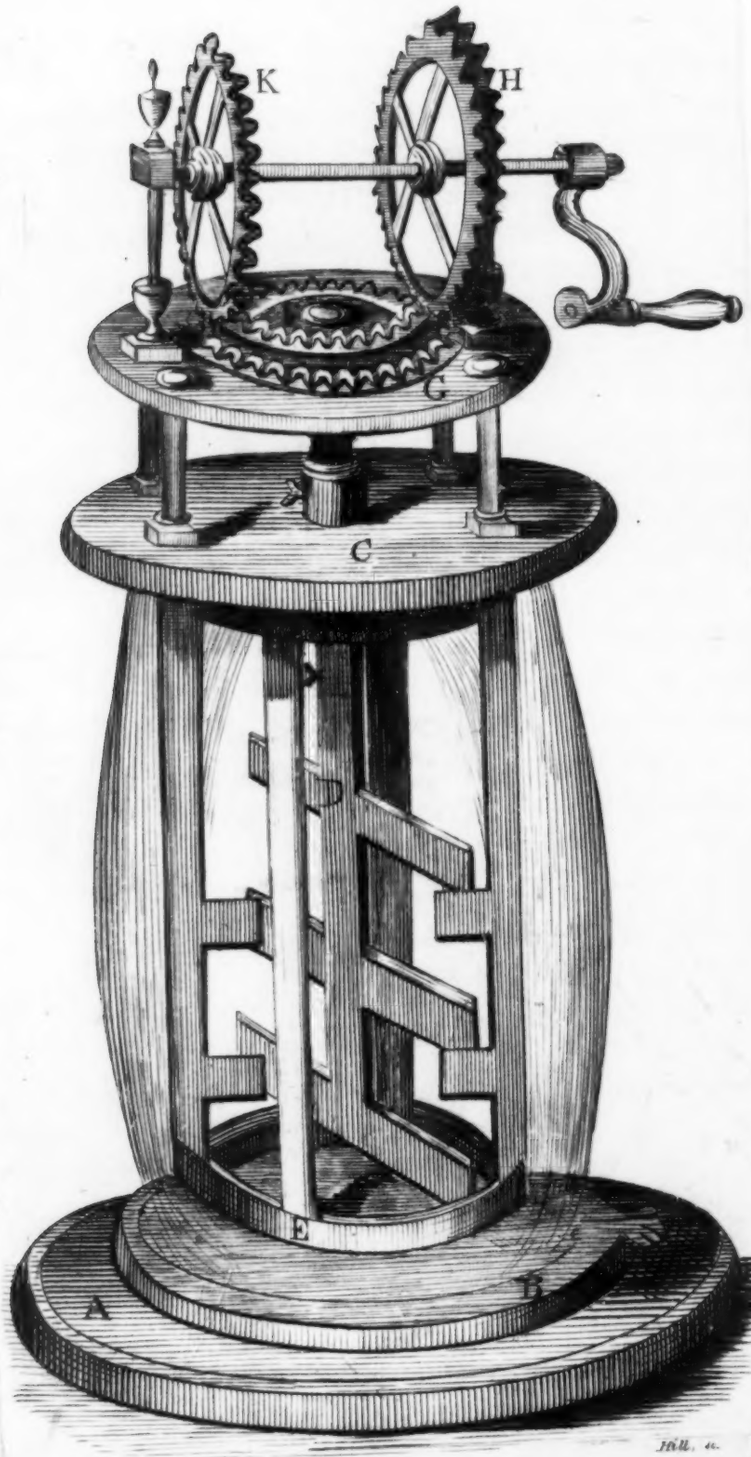
5. If the foregoing changes be thoroughly ascertained and scrutinized, may we not hope in time to be able to predict the alterations that are to happen in our atmosphere by them? It is possible that each of its constituent parts are increased and diminished with regularity in a kind of circle. That this is the case with heat we well know, which has a daily as well as annual circle. We shall, perhaps, in time have instruments to measure the quantity of oxygen, hydrogen, azot, &c. in the air, as well as thermometers and barometers. The circle then of all the species of air will be known to us, and we shall be able to foresee those conjunctions of them which produce all the different known effects on the weather, &c. in a way similar to our foresight of the conjunctions of the planets by calculating their different circles.

It is, perhaps, from these circles coinciding at times, and then necessarily diverging, that the atmosphere preserves that balance which is requisite for the production of vegetables, and, therefore, for the preservation of animal life. If it were otherwise, one state of weather might last so long as to extinguish totally the fertility of Nature. When, likewise, the different requisites for the production of one sort of weather coincide so accurately as to produce it to an extreme, and for a long continuance, it must be a longer time before such a coincidence can again occur; and the opposite condition of the air will therefore last for a length of time proportionate to the continuance of the former state. The accuracy of the coincidence just mentioned may be judged of, in some cases, at the very beginning. Thus when at the onset of either a hot or cold season there is a day in the extreme either way, we may, I believe, mostly expect a proportionate continuance of that species of weather.

6. Should we be able to foretell the changes of our atmosphere, the most important consequences would necessarily ensue. A year unproductive of grain would be foreseen, and so a scarcity or famine prevented. Hurricanes, frost, or great heats, we should be able to prepare for. Epizootic maladies being the consequences of the state of the air and vegetation combined, would be foreknown, and, therefore, probably prevented in man, if not in other animals. The human body, possibly, deriving a great part of its susceptibility of infectious feverish disorders from the state of the atmosphere, from which these disorders derive also much of their virulence, may we not hope in time to be able to prevent, or, in a great measure, to counteract them?



GLASS CHURN.



7. Finally, in all our researches into Nature, let us take accurate experiment for our sole guide, laying aside all preconceived positions, such as, that matter can neither act nor move of itself, by which is meant, independent of all but the *first great cause* : and let our motto be

Nil mortalibus arduum est.

A NEW CHURN.

THE editors of the Useful Cabinet are happy to exhibit to their readers the various improvements in the form of useful machines, which shall come to their knowledge; especially of such domestic implements as in all farmers families are in use during a great part of the year.

In this number is presented a plate impression of a new constructed churn. The machine from which it was drawn is of small size and would contain about three quarts, it was received from England, and found in Leveret's furniture warehouse.

The barrel is of glass nearly twice the length of its greatest diameter, the stand, cover and dashes are made of wood, the crank and wheels brass, the axis iron.

A the stand. B a ring of wood held by a screw through the bottom, to be closed by a screw pin near B, to keep the barrel steady in the stand.

C the cover extending over the top of the barrel, to which it is kept by two buttons, one on each side, turning under the lip of the barrel.

D is the center dash, with its paddles or beaters, so placed as to pass between those in the outer dash.

E the outer dash frame, constructed of a wood head at the top, and hoop at the bottom, connected by four bars in which are the paddles; the head and hoop are nearly equal in diameter to the diameter of the ends of the barrel; and are connected to the wheel G by a brass pillar, passing through the cover and form; the pillar is hollow to permit the axis of the center dash to pass through and connect with the wheel I, by which it receives its motion. The paddles are the thickness of the bars where they join, and tapered to an edge, like a wedge. The screw pins are to separate the dashes for cleaning.

In turning the crank, when the wheel H turns the outer dash by its wheel G in one direction; the wheel K turns the center dash by its wheel I in a counter direction; the wheels

are so proportioned that the revolutions of the dashes are performed in the same time.

The continual agitation produced by this churn must be communicated to all parts of the mass of cream, more uniformly and effectually than by the common churns. The barrel may be made of tin, with the bottom of less diameter than the other parts, and so as to guide the bottom of the outer dash; or it may be made of wood, in the same form as the plate describes, in the manner of a barrel; the wheels and crank may be of wood not liable to break, which might so reduce the price that it would be brought into general use. The teeth wheels of hornbine, which is a very tough wood, and capable of a good polish; for the other parts oak, maple, or ash may be used.

WOOL CLEANSED BY CHALK.

A NEW PROCESS FOR SCOURING WOOL, BY MR. ALLAIRE, FROM NICHOLSON'S JOURNAL.

This process consists in repeatedly immersing the wool in a warm chalk bath. The calcarious earth forms an animal soap with the greasy matter of the wool. By this method the wool is cleansed quickly, and without affecting its quality.

ON THE ADVANTAGES OF MALLEABLE ZINC, AND THE PURPOSES TO WHICH IT MAY BE APPLIED. *By Mr.* CHARLES SYLVESTER. *Extracted from Nicholson's Journal.*

"AT the time I had some conversation with you on the subject of malleable zinc, I was not aware of all the advantages possessed by that metal, though I could fully speak to the facility with which it could be worked into vessels, and of its application to other purposes. I was still, for want of longer experience, not decided as to its changeability when exposed to the action of water and air.

"From the great affinity which zinc possesses for oxigen, it might be expected to oxidate with great avidity, and on that account be rendered useless in the situations above alluded to; but, to the astonishment of most theorists, the contrary proves to be the case. Many specimens of zinc, both in the state of sheets and wire, have been exposed in the open air, as well as in damp rooms, without undergoing any other change than that of colour. Indeed it appears, that a piece of polished zinc will

lose its lustre, and assume a blue grey colour, when exposed in a damp room for the space of a few weeks. An oxide is formed upon the surface, which, though of an imperceptible thickness, is so exceedingly hard, and at the same time so insoluble, that it resists all the future attacks both of the air and of water. From numerous experiments I have ascertained, that copper is much more liable to waste than zinc in sea water, and even in strong solutions of muriate of soda. There cannot be therefore a doubt of its ready application to the sheathing of ships.

"For the purposes of roofing houses, forming cisterns, pumps, pipes, &c. it possesses many advantages over lead and copper. In the first place it is equally durable with those metals, without possessing any of their deleterious effects. It is also capable of being lapped and soldered with the same facility as sheets of copper, lead, or tinned iron plates; and may be worked to advantage equally by the brazier, the plumber, and the tinman. Its little specific gravity, which is to that of lead as 7 to 11, compared with its greater strength, which is 15 times that of lead, gives it a decided advantage over that metal in point of price. Allowing the sheet of zinc to be only $\frac{1}{4}$th the thickness of lead, the zinc will come in at one third the price of that metal. Its advantage in a similar point of view over copper will not admit of a question.

"The sheets are generally made 2 feet by 4, and can be rolled as thin as 6 ounces to the square foot."

As zinc is said to be found in many parts of the United States, it is desirable that some attempts to convert it into sheets and wire will be made, that we may not be dependant on London or Bristol, for an article of so great utility as this is described to be in the preceding chapter. EDITORS.

RECEIPT TO DETECT IMPURE WINE.

THE following important receipt is given by Professor Hanhemann, for detecting the mixture of lead in wine; a pernicious practice often followed by dealers in that article, to render it, when acid, more sweet and palatable, though destructive to the health and lives of those who drink it.

Let equal parts of oyster-shells and crude sulphur be kept in a white heat about 15 minutes, and when cold, mixed with an equal quantity of cream of tartar and put into a strong bot-

tle with common water to boil for an hour, and then decanted into bottles holding an ounce each, with 20 drops of muriatic acid in each. This liquor precipitates the least quantities of lead, copper, &c. from wines in a very sensible black precipitate. As iron might accidentally be contained in the wine, the muriatic acid is added to prevent its precipatation and its being taken for the precipitate of lead.

FOR THE USEFUL CABINET.

MILLING AND SCREW CUTTING TOOLS.

MESSRS. EDITORS,

IT is frequently the case, that many mechanics, for the want of the art or direction for making certain tools, which are necessary to their business, and which they could easily make, are obliged to purchase them at an enormous price of those who keep the art of making them a profound secret. This is a species of illiberality, which, while it withholds valuable arts from others, cannot enrich the withholder; and must therefore be considered highly derogatory to the character of American mechanics.

The following method of making milling tools, for milling the heads of finger screws for mathematical instruments, &c. and also for making hand tools for cutting screws in the tubes of telescopes, &c. with the lathe, is transmitted for publication in your Useful Cabinet, if you should think the same proper.

Of the milling tool. The only difficulty of making this tool is, in cutting the beading screw in the circular groove of the whirl or milling cutter. This is performed by a fine small screw tap with teeth filed lengthwise of it, well tempered, and fitted to run in a lathe. The whirl or milling cutter, which should be made of cast steel, being turned in a proper manner with a groove of the size of the screw tap, which is to cut it, and fitted into its frame or handle, is then held on the rest of the lathe horizontally with the groove of the whirl against the screw where it is cut by turning the lathe. Care must be taken to keep the tool oiled while cutting. After it is sufficiently cut in this manner, it must then be tempered the same as a common screw tap. The groove in the whirl ought to be a *half round.* Milling tools may be made in this way of any size and fineness of thread. It is convenient to have several different sizes.

Of hand tools for cutting screws with the lathe. The screw teeth in the end of the male and in the side of the female of these, are cut with large screw taps fitted to run in the lathe like the one before mentioned. The thread of the screw for cutting the teeth in these tools ought to be turned to sharp angles at the bottom as well as at the top. These tools are tempered as common edge tools.—To mechanics whose business requires the use of the lathe, these tools will be found very convenient, and often necessary. A little practice will enable a person accustomed to turning to cut screws with them with the greatest ease and neatness. In cutting long and large iron and steel screws for machines, where it is necessary to have them perfectly straight and true, these tools may be used to great advantage. With guages fixed to them screws may be cut by them perfectly even and of the same size.

When once an art or method is known, it will be easy to make the instrument of any size and fitness required. With the old maxim, "that in many branches of mechanics, a workman is not considered fit to use *some tools* until he is capable of making them;" and with the hope that no American mechanic may be charged with the illiberality of keeping any mechanic art as a secret, when it cannot do him any injury to have it known, and which would be of service to his fellow citizens. I conclude.

Yours &c.

AN AMERICAN.

ORIGIN OF ARTS.

(Continued from page 92.)

THE invention of the magnetic needle, or mariner's compass is ascribed to John Goya of Naples, who flourished as an eminent mechanic, A. D. 1300. By this discovery new sources of inexhaustible wealth are opened to excite the industry and commercial enterprise of mankind, to the enriching themselves, by diffusing to millions of the human race the blessings of life. What a grand, what a noble, what a sublime scene is by this wonderful instrument displayed? Behold the proud ships upon the mighty deep loaded with millions of property, guided in safety, *by this little director*, through trackless oceans to the remote regions of the earth! Is not the inventor of such a *faithful guide* a greater benefactor to mankind than all the

conquering heroes ancient and modern ? Yet the genius of the historian has been exhausted in displaying *their exploits* to immortalize their names in the voluminous pages of history, while scarcely a tear-drop of ink is shed in grateful remembrance of him, from whom *this invention* springs, to enrich, to associate, and to civilize the world.

By the exchange of merchandize in different countries for the produce of those climes, a nation becomes rich and powerful. Government is supported by the revenue of commerce, and the people, freed from burdensome taxes, are left stimulated with the bright prospect of certain wealth to enjoy the fruits of their labor. Industry will always be in proportion to the returns it receives. No system, no order in human affairs is calculated with more certainty to excite and reward industry, and to extend its beneficial effects, than commerce. Indeed without it, three quarters of the habitable globe would be a barren waste.—And without the mariner's compass, commerce would be but a doubtful and dangerous pursuit ; and this western world, this delightful abode of all the choicest blessings of human life would have remained unknown to Europe, and the war song of savage barbarity would still be the discordant music to disturb the solemn silence of the woods.

Several centuries B. C. according to history, a person by the name of Magnes, walking over a stone mine with iron nails in his shoes found his feet strongly attracted to the stone. This singular circumstance occasioned the discovery of the common magnet or load stone, which received its name from the person, who had been first sensible of its power. But the honor of discovering the directive power, which the magnet gives to the needle of a compass was reserved for John Goya in 1300. Since this time, the mariner's compass has received every improvement, which its importance could suggest, or philosophy and experiment devise. The sensibility and goodness of a needle, after it has been properly made and impregnated with magnetism, depend on the point of suspension being made so perfect as to remove comparatively all the friction. To obtain this object the center pin, upon which the needle is suspended, should be made of a wire compounded of equal parts of gold and brass ; and the concave center of the needle be made of the same or of agate stone well polished. This composition of gold and brass for this purpose will neither be corroded by salt nor subject to much wear or friction. And the expence of it is trifling in comparison to the goodness and accuracy it will give the nee-

dle. The needle itself should be made of the best cast steel, very light, well tempered, perfectly straight, polished and blued, and accurately balanced. Then it is to be touched, as it is called, with a good magnet, by drawing the south pole of the magnet from the center of the needle to its north end, and the north pole of the magnet upon the south part of the needle. After it is touched in this manner sufficiently, which will be when the operation is repeated twenty or thirty times, the north end of the needle in northern latitudes will incline down a little. This is called the dip of the needle, which will increase or decrease according to the latitude of the place.

A dipping needle constructed for the purpose of ascertaining the dip or inclination of the needle, must be suspended and perfectly balanced upon extremely fine pivots, somewhat like a common scale beam; with this difference, that the pivots must be perfectly round; and instead of turning in common pivot holes in the box, they should rest upon straight and horizontal lines almost as fine as the edge of a knife. The box should be suspended in such a manner as to preserve a horizontal position at all times. If with good dipping needles experienced mariners would ascertain and calculate correct tables of the dip or inclination of the dipping needle for the north and south latitudes, there is no doubt but that a good dipping needle with these tables might supply the place of the mariner's quadrant in cloudy weather. This, it is apprehended, is an object of importance. Whether it is practicable to any certain degree of accuracy experience must decide. The object is worth the experiment. For the dip of the needle, according to observations made in London for upwards of 200 years past, remains pretty much the same at the same place. It is certain, however, that the dip is different in different latitudes, and that it increases in going northward. In a voyage towards the north pole in 1773, the dip of a good marine dipping needle was found to be as follows, viz.

In latitude 60° 18′, the dip was 75° 0′.
In latitude 70° 45′, the dip was 77° 52′.
In latitude 80° 12′, the dip was 81° 52′.
In latitude 80° 27′, the dip was 82° 2½′.

In this manner tables might be constructed to great advantage.

The phenomena of the dipping needle, and of the mariner's compass with its continual variations, leave no room to doubt but that the *cause* exists in or near the poles of the earth.

Columbus in 1492 on his voyage for the discovery of this western continent, was the first who observed the variation of the needle. While this circumstance filled his crew with terror and dismay, as if nature herself had changed, he, unshaken in his design, rose superior to every danger, and safely landed on this western shore, to which his mighty genius had long been attracted—Millions of freemen, now enjoying the fruits of *his discovery*, return him their unceasing and grateful thanks for his noble resolution.—The variation of the compass has now become familiar; and though its true deviation cannot at all times be known, yet it no longer appals the seaman's courage. This variation is not only different at different places, but is different at different times at the same places. At London in 1580 the variation was 11° 15′ east; and in 1780 it was 22° 41′ west; having in 200 years traversed 33° 56′ from east to west, which is nearly 10′ yearly variation.

Mr. Churchman of America, endeavours to account for the variation of the compass by supposing that there are two magnetic poles, the north one to make a complete revolution round the north pole of the earth in 426 years, 77 days and 9 hours; the south, to make a revolution round the south pole of the earth in about 5459 years. In the beginning of the year 1777, the north magnetic pole was in latitude 76° 4′, and 140° east longitude of Greenwich; the south magnetic pole in south latitude 72°, and 140° east longitude of Greenwich. According to this theory there must of course be a continual variation of the needle, either west or east. This circumstance requires attention in surveying lands with the compass. The year of the survey and the correct variation of the needle ought to be noted on the plans of all surveys. At the present day the variation at Boston is five degrees and a few minutes west, and is continually traversing eastward.

The needle is also affected by heat and cold. The deviation from the common variation as affected by heat and cold in London 1759, was found to be as follows, viz.

Jan. 7′ 8″. Feb. 8′ 58″. Mar. 11′ 17″. Apr. 12′ 26″. May, 13′ 0″. June, 13′ 21″. July, 13′ 14″. Aug. 12′ 19″. Sept. 11′ 43″. Oct. 10′ 36″. Nov. 8′ 9″. Dec. 6′ 58″. west. There is likewise a difference of variation during the different hours of the day.

The invention of the mariner's compass, has produced astonishing changes in human affairs. Besides the commercial intercourse it has introduced among the numerous nations of the earth,

and the moral and political consequences resulting therefrom, it has opened a wide field for the display of human genius in naval architecture. To this noble and scientific art, the laws of proportion, the powers of mechanics, and the principles of natural philosophy have been united and applied in the construction of large ships with wonderful effect. In naval architecture the English have exceeded all other nations. Their ships are durable, strong, and good for sailing. American genius has made many improvements, and now bids fair to rival Europe in the building of the finest sailing vessels. In order to have a ship sail fast, it is necessary to proportion her bottom in such a manner as to have it meet with the least possible resistance in the water according to its magnitude and tonnage. To this part of ship building some further aid might undoubtedly be obtained by an observance of that admirable proportion for swiftness found in certain fresh water fish. For it is true, that the most happy proportions, of which any of the arts can now boast, are taken directly from the works of nature, which, we are assured, are regulated by the laws of infinite wisdom.

The construction of large merchant ships as well as large ships of war, has unquestionably resulted from the invention of the mariner's compass, gunpowder, and cannon. The art and science of ship-building, however, progressed for several centuries very slow. For although the use of cannon in naval actions was introduced in the year 1376, by the Venetians in their wars against Genoa, yet it was not until the beginning of the sixteenth century that they came into general use on board of ships, constructed large and strong for the purpose of war. Since this period England and France have at different times exerted all their energies to rival each other in the equipment of the largest and most powerful navies. Maritime wars have followed of course, in which victory has generally declared for that commander, who with equal courage, but with more skill and experience, has been able to out manœuvre the other.—No power, or force, ever wielded by the human arm, is so irresistable and tremendous, as that of a large navy commanded by an experienced officer. A more grand and truly sublime scene cannot be displayed by genius and art to the imagination. By them kingdoms and empires are won, and lost; and the whole commercial and political world made to feel and own their power. Commercial nations have, therefore, ever considered it a wise policy to have an adequate naval force for the protection of their commerce. The consequence of which has been, that

they havebecome rich, powerful, and respected, through the medium of industry, excited in all classes of people, by such a wise policy.

America now opens a wide prospective scene, in which the contemplative and patriotic mind views the materials, the genius, the art, and the industry, for erecting thousands of ships, for commerce and for war, which shall diffuse the blessings of life, and secure their enjoyment to millions of the human race.

The invention of hats made of wool, or fur, as at the present day, is attributed to a Swiss gentleman residing at Paris in France, in 1404. The importance of this discovery, as furnishing a very necessary, durable, not expensive, and elegant article of dress, will be readily acknowledged by every person in a state of civilization. It is now one of the many branches of manufacture, which, by individual industry, has been carried to a great degree of perfection. A good fur hat, though common, is the most elegant and conspicuous part of a gentleman's attire. The English have long been celebrated for the manufacture of this article, which forms a considerable item in their commercial dealings. Those made in this country have in many instances justly received the preference. As America furnishes the principal materials in great abundance; and as those engaged in the manufacture of this important article can supply the country with it of equal, if not of superior quality to those imported, if properly encouraged, it will be readily seen that this is a manufacture, which deserves the patronage of every gentleman.

To Dr. John Faustus, of Mentz, in Germany, a man of great genius and learning, is attributed the invention of PRINTING, in the year 1444. Peter Shoeffer his son-in-law assisted him in perfecting this discovery, by inventing the method of casting the types singly in matrices, or mould, similar to what is practised at the present day. Having carried this grand invention into operation in his own country to great advantage, Faustus then introduced it at Paris. Here he sold his printed copies of the Bible for £.60 sterling each, which was but half the price for a manuscript copy at that time. In consequence of this he was charged with witchcraft. This was the ignoble contrivance of the French in order to plunder him of his invention. And the man, who by his genius and industry had brought to light one of the most important discoveries the world has ever witness. d, and which will, as long as time shall endure, continue to be the great fountain from which will ever flow the choicest blessings of hu-

man life, was by the infamous parliament of Paris condemned to be burned as a conjurer. The Archbishop of Paris, *(pious man)* with all the seriousness and gravity of a minister of the christian religion, pretended to believe, "*that Faustus must have got the devil to assist him in printing or transcribing the bible to enable him to sell it so cheap.*" As ridiculous as this idea must have appeared, for a christian minister to believe, that the devil should assist in the pious work of printing the bible, yet it had its effect, and Faustus saved his life only by the disclosure of his invention to his rapacious accusers. While this conduct shows the high estimation in which this invention was held, it at the same time discovers the most detestable principles in the French court, to jeopardise the life of a man, in order to plunder him of his invention.

In a few years the introduction of printing became general. Various histories and geographical descriptions of different countries, which for many centuries had lain dormant, or been in the hands of a few of the rich and great, to the exclusion of the rest of the world, were soon printed off, and circulated with astonishing rapidity. Knowledge was diffused, and like the radiance of the sun, enlightened and vivified the human mind; which had for ages slumbered in the dark shades of ignorance, barbarity, and superstition. Science again shone forth and dispelled the gloom of a benighted world. Millions awoke, *as if from the dead*, and with hearts of gratitude and joy, hailed this auspicious era, as the dawn of a happy day, in which future generations would be supremely blest.

Curiosity and enterprise to visit foreign countries were excited, and by the aid of the mariner's compass in connection with this, new channels of commerce were opened to different parts of the world, by which in the course of time nations became acquainted with others, civilized, rich, powerful, and happy. Free governments have been instituted, equal laws established, and learning diffused. The rich, the poor, the high and low, all participate in the general blessings this invention brings.

The names of Roger Bacon, John Goya, and Dr. John Faustus, the inventors of gunpowder, of the mariner's compass, and of printing, will be held in grateful remembrance, while those of kings and fallen empires shall be entirely forgotten. The great and happy change produced by the inventions of these three men in the condition of mankind, is beyond all description. The imagination contemplates the blissful scene by them dis-

played, while the grateful heart pays the willing homage due to those, by whom the general condition of mankind has been freed from weakness, poverty, and ignorance.

[*To be continued.*]

On the Revival of an Obsolete Mode of managing Strawberries. By the Right Hon Sir Joseph Banks, Bart. K. B. P. R. S. &c. *From the Transactions of the Horticultural Society.*

THE custom of laying straw under strawberry plants, when their fruit begins to swell, is probably very old in this country: the name of the fruit bears testimony in favour of this conjecture, for the plant has no relation to straw in any other way, and no other European language applies the idea of straw in any shape to the name of the berry, or to the plant that bears it.

When Sir Joseph Banks came to Spring Grove in 1779 he found this practice in the garden. John Smith, the gardener, well known among his brethren as a man of more than ordinary abilities in the profession, had used it there many years; he learned it soon after he came to London from Scotland; probably at the Neat Houses, where he first worked among the market gardeners, it is therefore clearly an old practice, though now almost obsolete.

Its use in preserving a crop is very extensive: it shades the roots from the sun; prevents the waste of moisture by evaporation, and consequently, in dry times, when watering is necessary, makes a less quantity of water suffice than would be used if the sun could act immediately on the surface of the mould; besides, it keeps the leaning fruit from resting on the earth, and gives the whole an air of neatness as well as an effect of real cleanliness, which should never be wanting in a gentleman's garden.

The strawberry beds in that garden at Spring Grove, which has been measured for the purpose of ascertaining the expense incurred by this method of management, are about 75 feet long, and five feet wide, each containing three rows of plants, and of course requiring four rows of straw to be laid under them. The whole consists of 600 feet of beds, or 1800 feet of strawberry plants, of different sorts, in rows. The strawing of these

beds consumed this year, 1806, the long straw of 26 trusses, for the short straw being as good for litter as the long straw, but less applicable to this use, is taken out ; if we allow then, on the original 26 trusses, six for the short straw taken out and applied to other uses, 20 trusses will remain, which cost this year 10*d.* a trus, or 16*s.* 8*d.* being one penny for every nine feet of strawberries in rows.

From this original expenditure the value of the manure made by the straw when taken from the beds must be deducted, as the whole of it goes undiminished to the dunghill as soon as the crop is over. The cost of this practice therefore cannot be considered as heavy ; in the present year not a single shower fell at Spring Grove, from the time the straw was laid down till the crop of scarlets was nearly finished, at the end of June. The expense of strawing was therefore many times repaid by the saving made in the labour of watering, and the profit of this saving was immediately brought to account in increase of other crops, by the use of water spared from the strawberries ; and besides, the berries themselves were, under this management, as fair and nearly as large as in ordinary years, but the general complaint of the gardeners this year was, that the scarlets did not reach half their natural size, and of course required twice as many to fill a pottle as would do it in a good year.

In wet years the straw is of less importance in this point of view, but in years moderately wet, the use of strawing sometimes makes watering wholly unnecessary, when gardeners who do not straw are under the necessity of resorting to it ; and we all know that if watering is once begun, it cannot be left off till rain enough has fallen to give the ground a thorough soaking.

Even in wet years the straw does considerable service, heavy rains never fail to dash up abundance of mould, and fix it upon the berries, this is entirely prevented, as well as the dirtiness of those berries that lean down upon the earth, so that the whole crop is kept pure and clean ; no earthy taste will be observed in eating the fruit that has been strawed, and the cream which is sometimes soiled when mixed with strawberries, by the dirt that adheres to them, especially in the early part of the season, will retain to the last drop that unsullied red and white, which gives almost as much satisfaction to the eye while we are eating it, as the taste of that most excellent mixture does to the palate.

ON CLOCK PENDULUMS.

[*Continued from page* 117.]

IN closing this communication on clock pendulums it may be proper to observe, that the principles above laid down for the construction of recoiling pallets, were about eight years ago introduced by the writer of this article. And experiment has fully proved this escapement superior to any other ever devised for the purpose of keeping accurate time. This is, however, contrary to the opinion of Europeans on this subject. But fair experiment made upon the correct principles of mechanical powers operating by the well known laws of motion, must be conclusive *in spite of the obstinacy of a host of old errors.* If then in a branch of mechanics, upon the perfection of which in a great measure depends the progress of science, especially astronomy, surveying, and navigation, some further improvements have been made, which tend directly to this object, they will undoubtedly be considered of importance, at least by the American clock-maker.

Some observations concerning engines for cutting the teeth of wheels and pinions, will close this communication.

The important qualities of a common clock engine are,

First. That the numbers on the division plate be accurately divided, drilled through, and counter sunk on the underside of the plate.

Secondly. That the center arber, on which the wheels are screwed to be cut, be perfectly true, so that the cutter may not cut the teeth on one side of the wheel deeper than on the other. This is essential. For if the teeth are cut deeper on one side of the wheel than on the other, they will be finer on one side than on the other.

Thirdly. The frame ought to be made of iron or brass. The slide should move upon a level surface. The centers and tightning screws must be made and fitted in such a manner, that no part of the machine can give way or work loose while cutting with it. The cutter may be turned by a wheel and pinion as is commonly the case; but a large wheel and band would be preferable and not so expensive.

In addition to a common engine of this construction for cutting the teeth of clock wheels, every clock-maker, who would wish to do his work well and with but little manual labour, ought to have another engine for the particular purpose of *rounding up the teeth of the wheels*, after they are riveted on to the pin-

ions, and fitted into the clock frame. With an engine for this purpose, a workman would gain one day at least out of six, the teeth of his wheels would be perfectly equal and true, and his clocks much better. The cutter of this engine must be turned by a band and wheel. The only difficulty in making this tool, is to contrive a sure and correct method of fixing the wheel into the engine after it is riveted on to the pinion. To obtain this object, the center arber on which the division plate turns, should be made like a tube with a well fitted center in it, so constructed as to be moveable up or down in a manner similar to a center pin in a common clock-maker's lathe. Directly over the center of this perpendicular pin a counter center pin should be fixed as in a watch-maker's engine. The wheel when put into the engine for rounding and finishing its teeth, *turns upon the center of its pinion*; and is connected firmly to the arber of the division plate by a steel screw clamp, screwed to the pinion arber, and adjusted by side screws in the center arber, so that the cutter may fall into the teeth of the wheel in a proper manner. As in the operation of rounding up the teeth of a wheel by this engine, the wheel turns upon its pinion centers, it will of course be rendered perfectly true, and the teeth all alike and exactly equal, which cannot be the case when they are rounded up by hand with a file, as is the common practice. A rest must also be fixed under the wheel next to the cutter, so as to render it firm while cutting. To this rest there should be a counter part to come down upon the wheel with a screw, so as to render the wheel secure by screwing it, as it were, in a vice for every tooth that is rounded up. This part of the machine may be made so as not to take up but very little time in unscrewing, to turn the wheel to the next tooth and then screwing it firm again. This however would only be necessary when the wheel is very thin and delicate.

The slide and other parts of this engine are made like common ones.

An engine, for cutting steel pinions, is made similar to the above, excepting the rest, which, in this machine, is fixed so as to steady the pinion arber on the side opposite to the cutter. For cutting steel pinions the cutter ought to be very large, turn slow, and have a small reservoir under it, filled with oil, similar to a trough of a grindstone. The cutter to this engine must be turned with a band and wheel.

With good engines, made according to the above rules, clock-makers would be able to make much better work, and with

much less labor. It is however too often the case that this class of mechanics work all their lives with very bad tools, especially engines. The natural consequence of which, is, that they spend much time to make even ordinary work, and meet with but little encouragement, or patronage. Whereas, if they would have the resolution to make or procure good and correct engines, suitable for clocks and time pieces, and make their work according to the principles given in the preceding part of this communication, they would not only make their work much better and in less time, but would find encouragement, and receive the custom of those, who now send to Europe for good time keepers; upon the presumption that they cannot be made in this country. This however is not true; for even those clocks and time pieces imported from Europe, though they may look better, yet do not keep better time than many of those made in America. And considering the little patronage that has as yet been bestowed upon American clock-makers, it is really astonishing they should have had the perseverance to make what improvements they have, with the tools they have been obliged to use.

AMERICAN.

TEST OF THE GLAZE OF POTTERY.

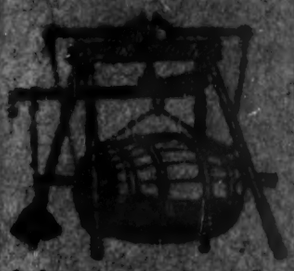
Process for proving the Quality of a Glaze of Earthen Ware.

THE glaze of earthen ware may have several defects: it may be scratched more or less readily by a hard body; weak acids, such as vinegar, lemon-juice, verjuice, &c. may attack and dissolve the lead it contains; or oily substances standing long on it may produce the same effect, stain it, and render it dull.

To determine its power of resisting friction, it may be rubbed with sand; and if this scratch it more readily than it does a glaze known to be good, we may be assured it is soft.

If vinegar be boiled some hours in a vessel coated with a soft glaze, it will attack the glaze, and dissolve a portion of its lead, which will be precipitated from the vinegar on the addition of a few drops of sulphuric acid, commonly called oil of vitriol.

But a method more within every one's reach, and therefore deserving to be known, is, to let fall a drop of strong ink on a piece of earthen ware, dry it before the fire, and then wash it. If the glaze be too soft, the ink will leave on it a slight spot.



THE PROPORTIONAL BALANCE.

This valuable instrument is for sale at Mr. DEARBORN'S Balance Factory, near the western end of the Theatre, Boston.—Its reputation is established by extensive use in the United States, and other parts of the world. In comparison with Scales and Weights for weighing large drafts, the purchaser of the Proportional Balance saves nearly one half in the first cost, and more than half in the labour of using, while its weights are not liable to that corrosion, which is constantly reducing iron weights. All required sizes are made, for weighing a single pound or ten thousand.

Boston, January, 1808.

ADVERTISEMENTS will be received for insertion on the covers of these numbers, in the selection of which those concerning the most useful subjects will be prefered.

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*** A compleat list of *Original* Subscribers, will be added to the last Number for the year.

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This valuable instrument is for sale at Mr. DEARBORN'S Balance Factory, near the western end of the Theatre, Boston.—Its reputation is established by extensive use in the United States, and other parts the world. In comparison with Scales and Weights for eighing large drafts, the purchaser of the Proportional Balance ves nearly one half in the first cost, and more than half in the bour of using, while its weights are not liable to that corrosion, hich is constantly reducing iron weights. All required sizes e made, for weighing from a single pound to ten thousand.

PATENT CORN SHELLER.

ILSBURY'S patent Machines for Shelling Indian Corn are for sale by JACOB WELSH, the Proprietor in *Boston.* One of ese Machines, with the

NEW IMPROVEMENTS,

ay be seen at Mr. DEARBORN'S Factory.

Purchasers under the original Patent may, by application said WELSH, obtain a right to use the Improvements in their veral Districts.

Feb. 3.

JOHN BAZIN,

No. 39, *Cornhill,* *Has constantly on hand,*

AND FOR SALE,

DETTIBONE'S much approved Cast Steel Tools, *viz.*—warranted Broad Axes and Adzes; Narrow Axes; Drawing ives; Chizels, Plane Irons, &c. &c.

Boston, Feb. 3, 1808.

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R. John Richardson Jun.

S. Samuel Spear.

T. William Taylor.

W. Samuel Whitwell, Phineas S. Whitney, Henry Williams, Edward Williams, Benjamin Whipple, Charelestown.

N. A. U. A.

The members of the Newengland Association are notified that their March quarterly meeting is adjourned to the third Thursday of this month at Mrs. Marean's Hall in Elm-street, where a general and punctual attendance is requested.

March 3d. 1808.

Patent Cut Nails.

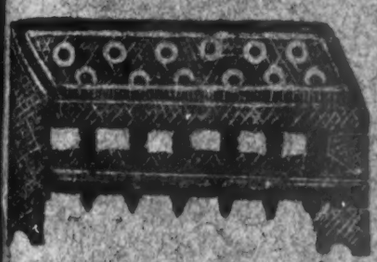
T & E. ODIORNE,

No. 2, Merchant's-Row, Offer for sale,

FOUR hundred casks of patent CUT NAILS, of a superior quality, and at the following prices, *viz.*—

4d		at	11	cents per. lb.
5d and	6d	do.	10½	do. do.
8d do.	10d	do.	10	do. do.
12d do.	20d	do.	9½	do. do.

The above Nails being Cut and Headed by one simple operation, are more uniformly alike, and have less waste than any Nails heretofore offered in this market for sale.



CANDLE MOULDS.

Hard-metal Candle Moulds, warranted equal to those manufactured in England, of all sizes may be had by applying to ROBERT CROCKER, Back-street or to JOSHUA WITHERLE, Washington-street.

Families may be supplied with moulds set in proper stands, with directions for using them, which will be found much more convenient and durable than the tin moulds commonly used.

JOHN BAZIN,

No. 39, Cornhill, Has constantly on hand,

AND FOR SALE,

PETTIBONE'S much approved Cast Steel Tools, *viz.*—warranted Broad Axes and Adzes; Narrow Axes; Drawing Knives; Chizels, Plane, Irons &c. &c.

Boston, Feb. 3, 1808.

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RESPECTFULLY informs the public, that he carries on the PRINTING BUSINESS, at No. 10, STATE-STREET, BOSTON, Where he executes all kinds of

BOOK AND ORNAMENTAL PRINTING,

in the most elegant manner.

N. B. *Books, Pamphlets, Circulars, Cards, Shopbills, &c &c.* Printed with neatness and dispatch.

*** The public patronage solicited and the smallest favour gratefully acknowledged.

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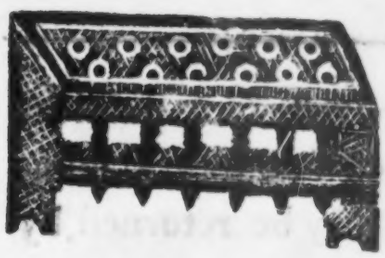
PATENT IMPROVED CANDLESTAND.

THIS is composed of a brass standing tube in the centre, and four sliding tubes, with a steel handle which also answers the purpose of a spring to confine the tubes. The sliding tubes being of four sizes, are capable of admitting a candle of almost any size, and the standing tube is far superior in its uses, to the common save-all, for it not only contracts every atom of tallow, but, being an inch above the surface of the other tubes, renders the whole of the candle useful, as otherwise with the common ca dlestand, at least one inch of the latter part of the candle is useless by being level with the socket.

CANDLE MOULDS.



Hard-metal Candle Moulds, warranted equal to those manufactured in England, of all sizes may be had by applying to ROBERT CROCKER, Back street, or to JOSEPH WITHERLE, Washington street.

Families may be fupplied with moulds set in proper stands with directions for using them, which will be found much more convenient and durable than the tin moulds commonly used.

ENGRAVING AND COPPER PLATE PRINTING.

JAMES HILL,

RESPECTFULLY informs the publick, that he carries on the above business at No. 7, Marlboro' street, where all commands will be executed with neatness and dispatch.

May 4.

Patent Cut Nails.

T. & E. ODIORNE,

No. 2, Merchant's-Row, *Offer for sale,*

FOUR hundred casks of patent CUT NAILS, of a superior quality, and at the following prices, viz.—

4d		at 11 cents	per lb.
5d and 6d	do.	10½ do.	do.
8d do. 10d	do.	10 do.	do.
12d do. 20d	do.	9½ do.	do.

The above Nails being Cut and Headed by one simple operation, are more uniformly alike, and have less waste than any Nails heretofore offered in this market for sale.

☞ SUBSCRIBER'S names received since publishing the last number, will be published in a future number, with such further additions as may be returned by the agents and friends of this publication.

ADVERTISEMENTS will be received for insertion on the covers of these numbers, in the selection of which, those concerning the most useful subjects will be prefered.

BOSTON:

PRINTED FOR THE ASSOCIATION,

BY E. G. HOUSE, AT THE *EMERALD OFFICE,*

No. 5, Court Street;

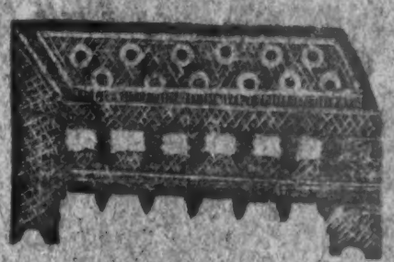
Where PRINTING in all its branches will be correctly executed, with neatness and dispatch.

PATENT IMPROVED CANDLESTAND.

THIS is composed of a brass standing tube in the centre, and four sliding tubes, with a steel handle which also answers the purpose of a spring to confine the tubes. The sliding tubes being of four sizes, are capable of admitting a candle of almost any size, and the standing tube is far superior in its uses, to the common save-all, for it not only contracts every atom of tallow, but, being an inch above the surface of the other tubes, renders the whole of the candle useful, as otherwise with the common candlestand, at least one inch of the latter part of the candle is useless by being level with the socket.

The above Instrument is for sale at Mr. Dearborn's Balance Factory, near the western end of the Theatre, Boston.

CANDLE MOULDS.



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JOSEPH NEWELL,

No. 11, Merchant's Row, Boston, Has for sale,

AN extensive assortment of HARD WARE an Ship Chandlery :—*Also*, a complete assortmen of Mathematical Instruments, viz.

Metal, brass and wood Sextants, Quadrants, Sp Glasses, brass and wood Surveyor's Compasses, wit balls, sockets and staffs ; a complete circle with a silve arch : with a great variety of Seamen's Books, Pilot Charts, &c.

Likewise, Makes, repairs and sells all kinds of Mat ematical Instruments.

N. B. Subscriptions for the Map of the United State and Louisiana, by Osgood Carleton, Esq. are receive at the above place, where one may be seen.

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